INSTRUCTION MANUAL

SERIES 5800
MODEL TOWER

SCIENTIFIC-ATLANTA, INC.

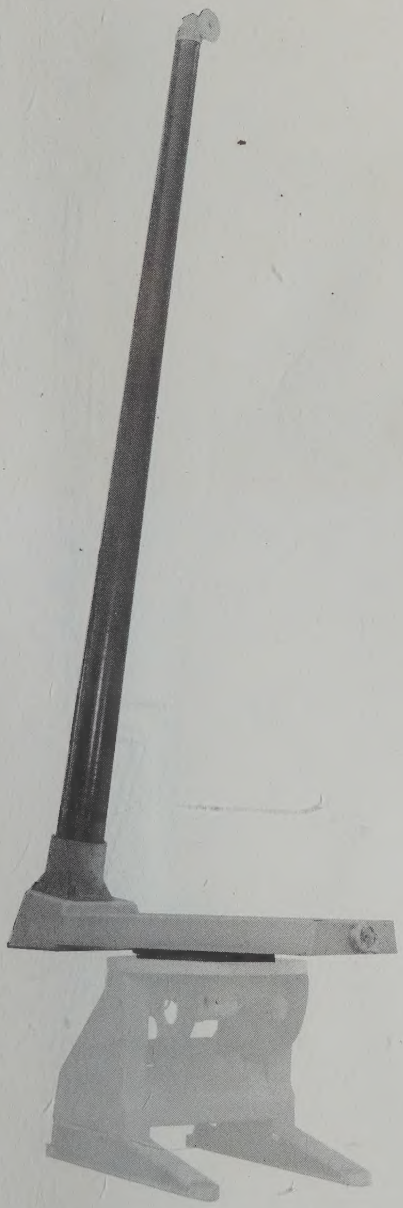
When ordering parts from Scientific-Atlanta, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

MODEL NO. 5871

SERIAL NO. 14

INSTRUCTION MANUAL

SERIES 5800
MODEL TOWER



Model 5862 Model Tower on
Series 5300 Positioner

P-453

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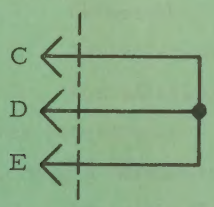
IMPORTANT NOTICE

If this model tower is removed from a Scientific-Atlanta Series 5300 Azimuth-Over-Elevation Antenna Positioner, pins C, D, and E in the connector into which the model tower cable was plugged must be jumpered together. These jumpers close the model-tower limit-switch interlock circuit in the positioner.



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CHAPTER 1
GENERAL DESCRIPTION

1.1 Introduction

Series 5800 Model Towers are used to support and position scale models of antenna-bearing vehicles when making antenna-pattern measurements under simulated free-space conditions. The Series 5850 and 5860 are light- and medium-duty towers, respectively; Series 5870 towers are heavy duty.

The towers are constructed of low-dielectric-constant materials, except for the metallic base and model-support head*. The head has a hollow shaft which is used to attach the model by means of a model-support arbor. A Scientific-Atlanta Series 24 Coaxial Rotary Joint can be mounted at the tower head to permit continuous model rotation. The tower proper is a glass-reinforced polyester tube of thin-wall, radome-type construction. It is inclined ten degrees to reduce scattering effects.

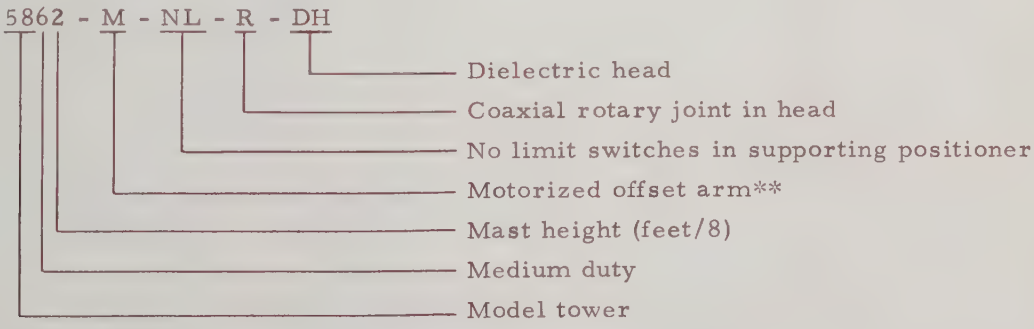
Towers are normally supplied with dual synchros having 36:1 and 1:1 ratios, but synchro data-takeoff ratios of 1:1 or 36:1 only also are available on special order.

Either an azimuth positioner or an azimuth-over-elevation positioner can be used with Series 5800 Model Towers. The tilting feature of azimuth-over-elevation positioners affords extra convenience during mounting and adjustment of the tower, and especially of the model itself.

1.2 Specifications

Specifications for the Series 5800 Model Towers are given in the table on the following page. The numbers in parentheses refer to Fig. 1.1.

MODEL NO. EXPLANATION


5862 - M - NL - R - DH
Dielectric head
Coaxial rotary joint in head
No limit switches in supporting positioner
Motorized offset arm**
Mast height (feet/8)
Medium duty
Model tower

*An all-dielectric head is an option; model suffix -DH.
**See 5800M instruction manual supplement.

Table 1.1. Model Tower Specifications

Characteristics		Tower Model No.						
		5851	5852	5861(-DH)	5862(-DH)	5863(-DH)	5871	5872
(1) Overall Height on Positioner	Az	10'-1"	18'-3"	10'-3"	18'-3"	26'-4"	10'-3"	18'-3"
(see below)	Az/El	11'-7"	20'-11"	12'-11"	20'-11"	29'-6"	12'-11"	21'-6"
(2) Tower Height		9'-0"	17'-1"	9'-1"	17'-1"	25'-1"	9'-1"	17'-1"
(3) Maximum Bending Moment	(Lb-Ft)	50	50	750(500)	750(500)	2000(500)	2000	2000
(4) Maximum Operating Load	(Lbs)	75	75	400(300)	400(300)	500(300)	750	750
(5) Maximum Head Torque	(Lb-Ft)	5	5	25(15)	25(15)	75(15)	75	75
(6) Mast Height	(Ft)	8	16	8	16	24	8	16
(7) Arm Swing Clearance		3'-8"	6'-2"	4'-8"	6'-2"	7'-8"	4'-8"	6'-2"
Maximum Head Speed	(rpm)	1	1	1	1	1	1	1
Mast Wall Thickness (Nominal)	(Inches)	0.18	0.18	0.25	0.25	0.375	0.25	0.25
Net Weight	(Lbs)	275	500	550	650	900	550	660
Shipping Weight	(Lbs)	400	750	750	900	1250	800	910
Suggested Azimuth Positioner		5105B-1	5115C-3	5115C-3	5115C-3	5123-7	5115C-3	5115C-3
Suggested Azimuth-Over-Elevation Positioner		5315C-3B	5323-7B	5323-7B	5323-7B	5330A-7B	5323-7B	5330A-7B
Arm Travel	(Head-Face-Offset)	0"-12"*	0"-24"	2"-24"	0"-24"	0"-24"	2"-24"	0"-24"

*Fixed two-inch increments (no handcrank).

(-DH) signifies dielectric head; use values in parentheses. Where one value shown, both ratings are identical. If dielectric head is installed in 5871 or 5872, use 5861-DH or 5862-DH ratings.

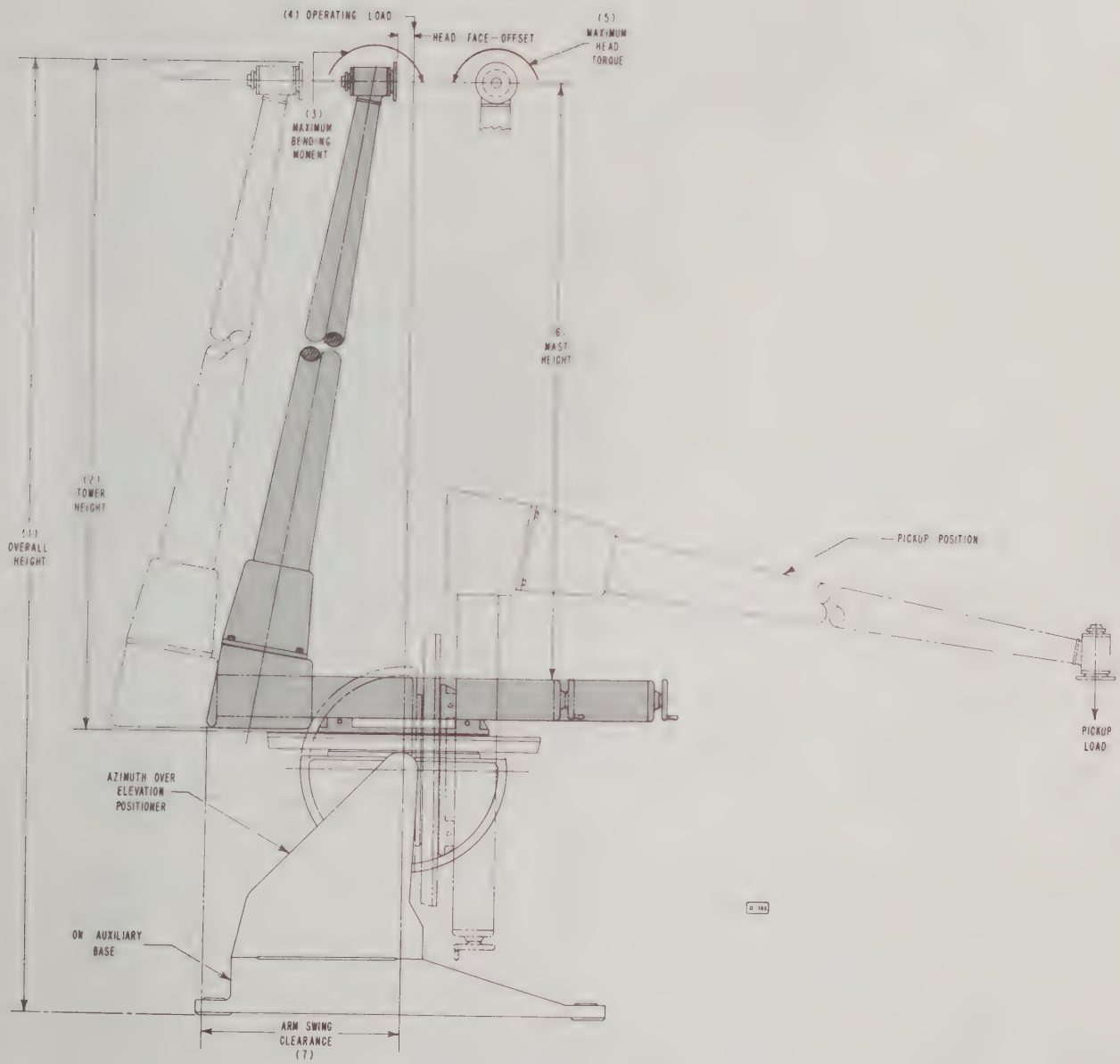


Fig. 1.1. Model Tower Mounted on Azimuth-Over-Elevation Positioner

CHAPTER 2
INSTALLATION AND OPERATION

2.1 Tower Assembly

The model tower is usually shipped in two pieces.

Attach the offset arm to an antenna positioner or other suitable mounting surface. Remove the sheet metal cover to gain access to the mounting bolts and electrical connectors. When the tower is to be mounted on a Series 5300-M Positioner, the tower base must be located over the sector-interlock switch actuating plate, which is below the upper azimuth turntable.

Next, secure the tower to the arm with the four bolts supplied. (See Fig. 1.1 for the correct assembly position.) Use caution when engaging the drive spline.

2.2 Electrical Connections

Electrical connections to the tower are made through a type MS connector and short cable to a terminal strip in the base casting. The cable connector supplied mates with the connector on the recommended Scientific-Atlanta supporting positioner. This cable can be removed and connections made directly to the terminal strip if desired. *

In towers with dual-synchro units, the S2 synchro terminals are now connected together in a common line to pin N of the tower cable connector. If the tower synchros are connected to a synchro indicator system that uses a different convention (S1 or S3 common), connect the tower synchro-common wire to the system synchro-common wire and connect the other wires as required for the proper direction of indicator rotation. If a zero reference must be maintained, interchange connections* as shown in Table 2.1.

*See the schematic diagram at the rear of this manual.

Table 2.1. Synchro-Wiring Correction Chart

If Receiver rotation w/respect to transmitter is	and When transmitter is at zero, receiver reads	Correction
Opposite	240°	Reverse S1 and S2
Opposite	120°	Reverse S2 and S3
Opposite	0°	Reverse S1 and S3
Same	120°	Connect S1 to S1, S2 to S2, S3 to S3
Same	240°	Connect S1 to S1, S2 to S2, S3 to S3
Same	180°	Reverse R1 and R2
Opposite	60°	Reverse R1 and R2; reverse S1 and S2
Opposite	300°	Reverse R1 and R2; reverse S2 and S3
Opposite	180°	Reverse R1 and R2; reverse S1 and S3
Same	300°	Reverse R1 and R2; connect S1 to S1, S2 to S2, S3 to S3
Same	60°	Reverse R1 and R2; connect S1 to S1, S2 to S2, S3 to S3

2.3 Continuous Head Rotation with Coaxial Rotary Joint

2.3.1 General

If continuous head rotation is specified at the time of ordering (model suffix "-R"), a coaxial rotary joint is supplied installed in the arbor (or head shaft in the dielectric head) and a length of coaxial cable is furnished. The cable terminates in a type N connector on a bracket on the base casting beneath the offset arm cover.

The rotary joint should not be subjected to tension, compression, or bending loads. Compression and bending loads will cause excessive wear on the bearings. A tension load may separate the contacting surfaces.

The Model 24 is sealed to prevent water from entering the joint. However, if the joint is subjected to a sufficient temperature drop, the moisture content of the inside air can condense. The joint can be dried by putting it in an oven heated to 150°F maximum for one hour. Allow the joint to cool in the oven.

Each joint is warranted to meet all published specifications and to be free of defective material and workmanship. The company's liability under this warranty is limited to service or replacement of defective parts returned to the factory--freight paid by buyer--within 90 days from date of shipment from the factory. Equipment showing damage by misuse or abnormal conditions of operation shall be excluded from this warranty.

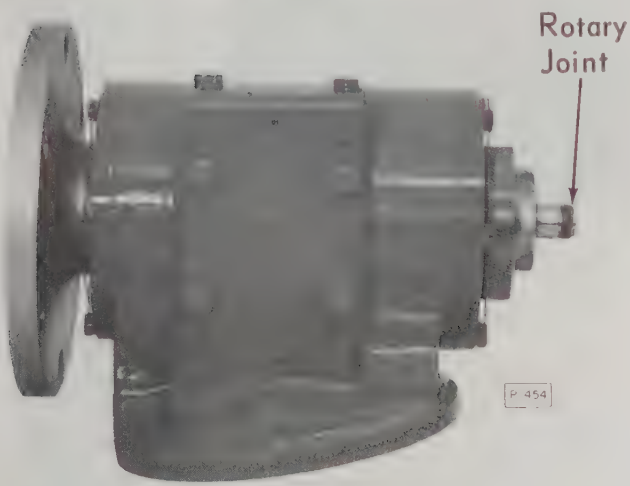
2.3.2 Installation in Metallic Head

A Scientific-Atlanta Series 24 Coaxial Rotary Joint can be installed in the model-support arbor in the field. To install the joint, proceed as follows:

(a) Take out the three flat-head screws that secure the phenolic mounting flange to the rotary joint. The flange is not required in this installation.

(b) Attach the cable from the model to the male end of the rotary joint.

(c) Slide the rotary joint into the arbor until the rotary joint housing is flush with the end of the arbor (see Fig. 2.1). Secure the joint with the set screws in the arbor. Do not overtighten; a snug fit is sufficient.



(d) Route a length of coaxial cable (RG-212/U for example) from the rotary joint down the plastic wiring trough and under the base casting. If desired, the cable can be strung out away from the tower. Tape the cable to the mast; do not allow the cable to pull directly on the rotary joint.

Fig. 2.1. Coaxial Rotary Joint Installed in Metallic Head

2.3.3 Installation in Dielectric Head

A Scientific-Atlanta Series 24 Coaxial Rotary Joint can be installed in the hollow head shaft in the field. To install the joint, proceed as follows:

(a) Take out the three flat-head screws that secure the phenolic mounting flange to the rotary joint. The flange is not required in this installation.

(b) Install the stabilizer ring and mounting ring on the rotary joint as shown in Fig. 2.2 (tighten the set screws just enough to hold the ring to the body of the rotary joint).

(c) Attach the cable from the model to the male end of the rotary joint.

(d) Slide the rotary joint into the head shaft and tighten the two captive screws finger tight.

(e) Route a length of coaxial cable (RG-212/U for example) from the rotary joint down the plastic wiring trough and under the base casting. If desired, the cable can be strung out away from the tower. Tape the cable to the mast; do not allow the cable to pull directly on the rotary joint.

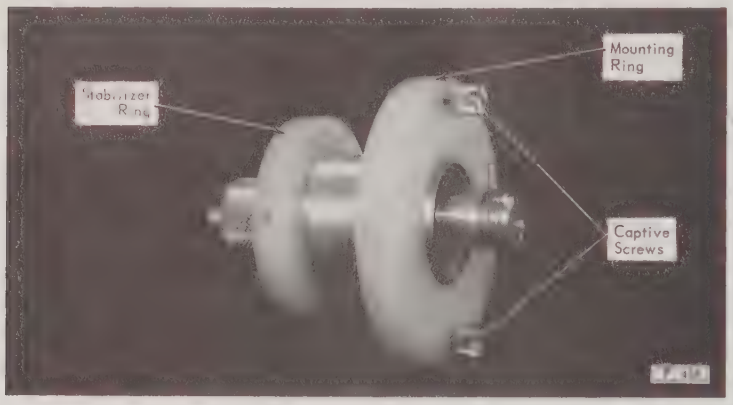


Fig. 2.2. Coaxial Rotary Joint with Dielectric Rings Installed

2.4 Tower Interlocks

An interlock switch is mounted in the offset arm*; it is used with interlock switches in the positioner when the model tower is mounted on a Scientific-Atlanta Series 5300-M Azimuth-Over-Elevation Positioner to prevent damage to the positioner and/or model tower. For example, on positioner without interlocks, if the turntable is positioned vertically and rotated in azimuth, the protruding end of the tower offset arm could strike the ground or the positioner base itself. In addition, the unbalanced weight of the model and tower might be great enough to create a bending moment about the azimuth axis that would exceed even the withstand torque rating of the positioner.

The nominal operating sectors of the tower and Series 5300-M Positioner combination are as follows:

(a) The prime elevation limits are set at +92°, forward, and at −30°, reverse. (These are the maximum elevation limits possible with the tower installed.)

*Model 5851 has no interlock switch.

(b) The azimuth section will operate unrestricted (unless azimuth limit switches are installed) while the turntable is within ±30° of horizontal.

(c) The turntable cannot be tilted forward more than +30° unless: (1) it is within the 40° sector (±20° with reference to zero position) and (2) the model tower offset arm is fully extended to the rear (except for 5851, which has no interlock switch).

(d) When conditions (1) and (2) in paragraph (c) above are met, the tower arm will be in the "pickup" position, and the turntable can then be tilted forward to +92°.

(e) The azimuth drive is inoperative when the turntable is tilted to more than +30°.

When the model tower is mounted on a positioner other than a Series 5300-M, the interlock switch in the offset arm has no effect on positioner operation.

2.5 Attaching a Model to the Head

Before attaching a load (model) to the head, make sure that all mounting bolts are secure and that the drive system operates smoothly and quietly.

2.5.1 Metallic Head

CAUTION

Do not exceed the head-shaft torque rating specified in Table 1.1. Torque loads can be applied to the head shaft in several ways, such as:

(a) Model unbalance,

(b) Tightening of threaded model-holding devices,

(c) Handling of the model during and after mounting,

(d) Operating in high winds with unbalanced model areas, and

(e) Inertia loads--stopping large models suddenly. (Models with high polar moments of inertia should be stopped by gradual reduction of rotational speed.)

If the tower is mounted to an azimuth-over-elevation positioner, the offset arm must be vertical when the maximum rated pickup load is raised (see Fig. 1.1).

Attach the arbor supplied with the tower to the model. If the tower is mounted on an elevation positioner, lower the tower to the pickup position (see Fig. 1.1 and paragraph 2.4).

Insert the arbor in the hollow head shaft; take care to align the key in the arbor with the slot in the head shaft. Push the arbor in as far as it will go and tighten the locking nut. Use the spanner wrench supplied. Do not overtighten; a snug fit is sufficient.

2.5.2 Dielectric Head

If the tower is mounted on an elevation positioner, lower the tower to the pickup position (see Fig. 1.1 and paragraph 2.4).

A three-inch diameter hole must be prepared in the model to receive the head shaft. Slip the model onto the shaft and secure the model to the flange (see Fig. 2.3).

> NOTE: The model load must be distributed evenly along the shaft; the flange should transmit rotational torque only.

The flange is tapped for 1/2-13 bolts, 6 places, equally spaced on a 5-1/2 inch diameter bolt circle. Make sure that when the bolts are tightened they will not touch the head surface behind the flange.

Replacement head shafts are available; refer to the parts list in Chapter 6. To remove the shaft, proceed as follows:

Take out the plug in the side of the head (see Fig. 2.3). Two set screws hold the head shaft in place and will be visible through the hole as the head shaft is turned. Rotate the head shaft as required and loosen each screw not more than 3 to 5 turns. Do not remove the set screws. The head shaft can now be slid out of the head.

To install a new shaft, reverse the procedure above. Do not overtighten the two set screws; a snug fit is sufficient.

2.6 Operation

Several precautions should be observed when operating the model tower to prevent damage to the tower or to the model.

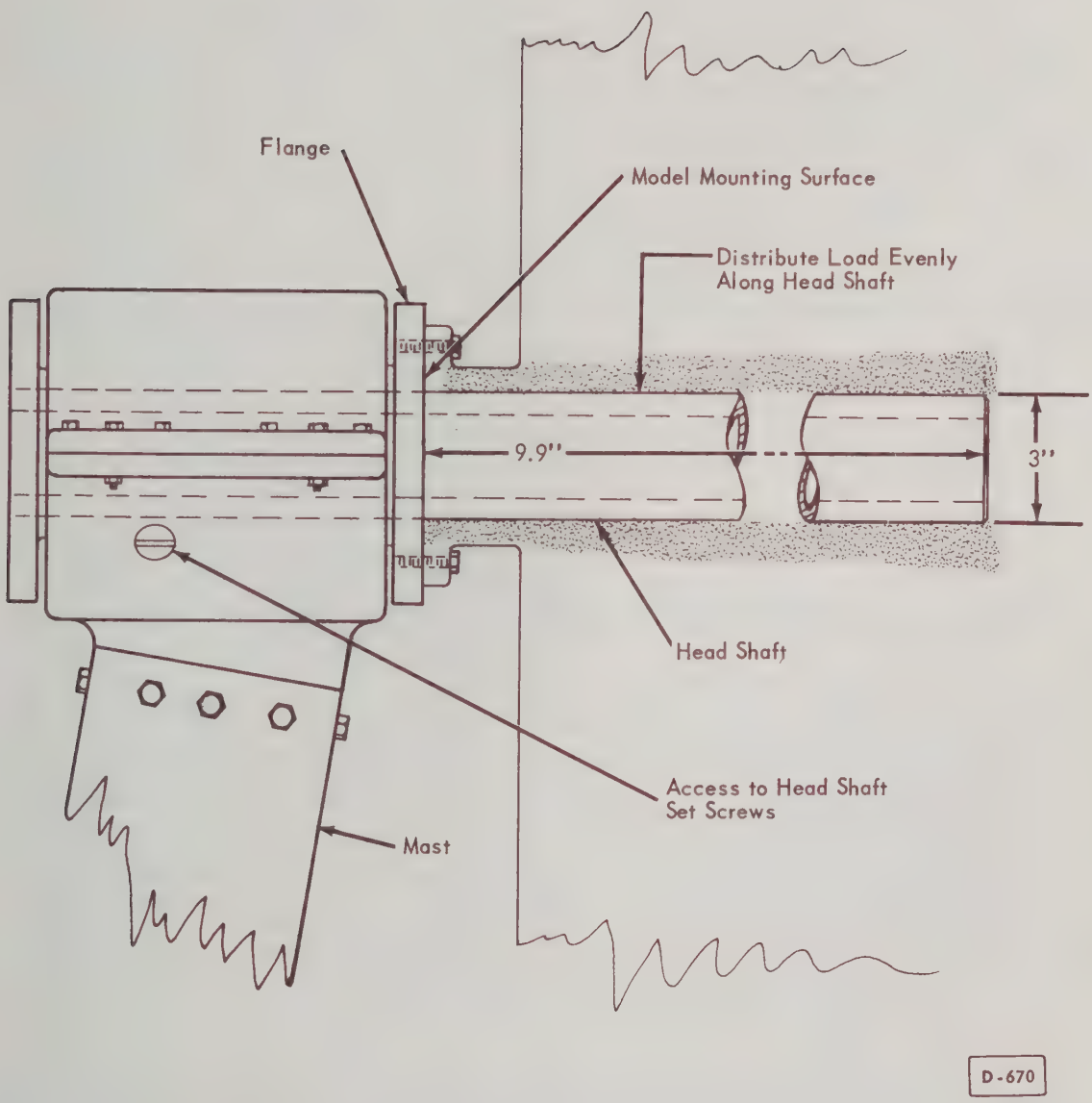


Fig. 2.3. Preferred Method of Mounting Model to Dielectric Head

Start and stop the model gradually. Sudden stopping of the model will cause unnecessary wear to the head gears and torque-tube spline, and could cause damage to the model itself.

Always check the area around the model tower for any obstructions that the model could hit.

Four clamps are used to hold the support base to the slide tubes (see Fig. 2.4). These clamps must be tightened at all times except when actually sliding the tower with the handcrank.

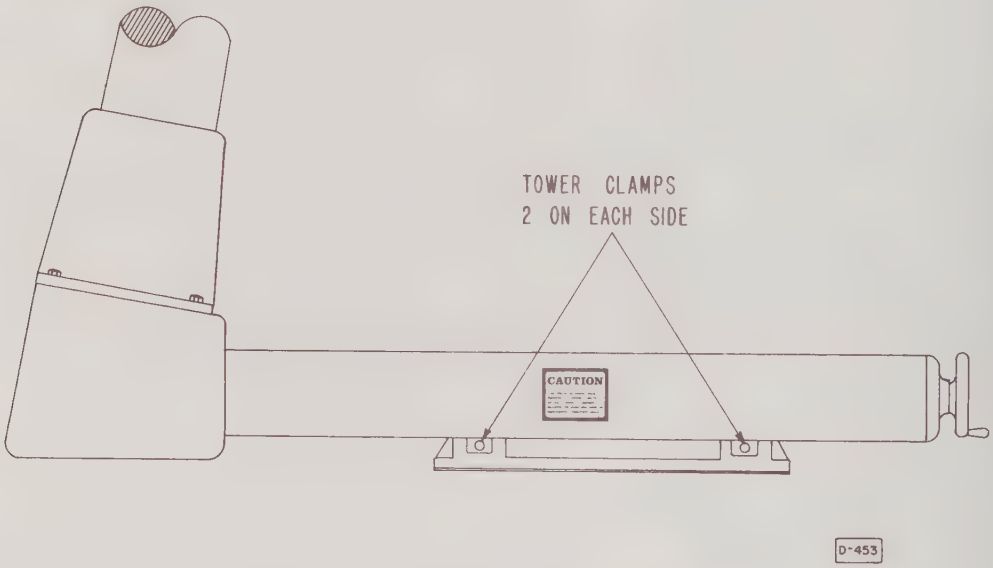


Fig. 2.4. Location of Tower Clamps

CAUTION

Loosen the tower clamps only to slide the tower with the handcrank. Use the handcrank only when the offset arm is horizontal.

When the model tower is mounted on a Scientific-Atlanta Series 5300-M Positioner, extend the tower offset arm to the rear as far as possible with the handcrank before tilting the tower down to install or remove a model. This will prevent damage to the positioner and/or offset arm (see paragraph 2.4).

Remove the model from the tower if high winds are anticipated.

If the cables are disconnected, place the protective caps over the positioner receptacle to protect the pins from dirt and to minimize tarnishing.

CHAPTER 3
DETAILED DESCRIPTION

This chapter describes the four major subassemblies of the tower. The numbers in parentheses refer to items shown in Fig. 6.1.

3.1 Head Assembly

3.1.1 Metallic Head

The head assembly (3) is basically a right-angle, worm-gear reducer with a hollow output shaft. The housing is a heat-treated aluminum casting.

The head contains an integral head shaft and worm gear which is machined from high-strength, cast aluminum bronze. The head shaft is bored to American Standard No. 45 steep taper to receive an arbor (5) or flanged stub shaft for mounting models. A hardened steel worm, used to drive the head shaft, is keyed to a steel drive shaft. The shaft bearings are mounted in an adjustable housing to facilitate backlash control (see paragraph 4.1).

3.1.2 Dielectric Head

The dielectric head (46) is quite similar to the metallic head, except that all parts are made of fiberglass, nylon, or Delrin.

The head contains a hollow shaft and integral worm gear as in the metallic head. A hollow fiberglass head shaft (44) is inserted within this shaft and secured to it by two dog-point nylon set screws. Two bearings support the shafts at front and rear. The shafts are driven by a Delrin worm on a shaft which protrudes out the bottom of the head. The shaft is attached to the torque tube by a Delrin universal joint. The worm-shaft bearings are mounted in an adjustable housing to facilitate backlash control (see paragraph 4.1).

3.2 Mast-Base Assembly

The mast assembly (12) consists of a tapered glass-fiber reinforced polyester tube shrink-fitted into a heat-treated aluminum base casting.

3.3 Drive-Train Assembly

The drive unit (17) consists of a spur gear train (18), a dc motor (21), and a synchro transmitter unit (20), all of which are mounted in the base casting of the offset arm.

The synchro transmitter unit is mounted on the lower face of the gearbox. It is driven by an output shaft from the gearbox through a flexible coupling (19). The electrical output from the synchro transmitter(s) can be used to drive a pattern recorder, integrator, radiation distribution printer, and/or remote position indicator.

The torque tube (11), which connects the drive assembly and tower head, is a glass-fiber reinforced-polyester tube. The lower end of the torque tube terminates in a female fitting (13) which fits over the male spline in the upper shaft extension of the gear box. The upper end of the torque tube is terminated in a universal joint (8) that is pinned to the head worm shaft.

3.4 Offset Arm Assembly

The offset arm assembly (16) serves two functions. First, it provides a secure mounting arrangement for the head-mast assembly; and, second, it permits the adjustment of the head-face offset (see Fig. 1.1). A handcrank provides continuously variable head-face-offset adjustment of up to 24 inches on all model towers, except the Model 5851 Tower. This tower is manually positioned from 0 to 12 inches.

CHAPTER 4
ADJUSTMENTS

4.1 Head Backlash

Backlash may appear in the tower head after extensive use. A field adjustment can be made to reduce this backlash to within the specified limit. It is recommended that an experienced machinist perform this adjustment and that precautions relating to precision gear assemblies be observed. The following procedure is applicable to both the metallic and dielectric heads.

(a) Remove the bolts that hold the tower head to the mast and pull the head out just far enought to expose the universal joint.

(b) Pull out the pin (item (7), Fig. 6.1) in the universal joint and separate the joint.

(c) Remove the bolts that hold the plate at the top of the head and take off the plate.

(d) Remove the bolts from the adjustment plate and pull it off the dowel pins.

(e) Take out one layer of laminated metallic shim stock (0.002 inch), or one piece of red plastic shim, from one side only.

(f) Tighten all bolts.

(g) Check the backlash at the worm shaft.

(h) If the backlash is still excessive, remove 0.002 inch from the opposite side.

(i) Repeat steps (f) and (g).

(j) If more adjustment is needed, repeat the procedure as necessary, but alternate sides when removing laminations.

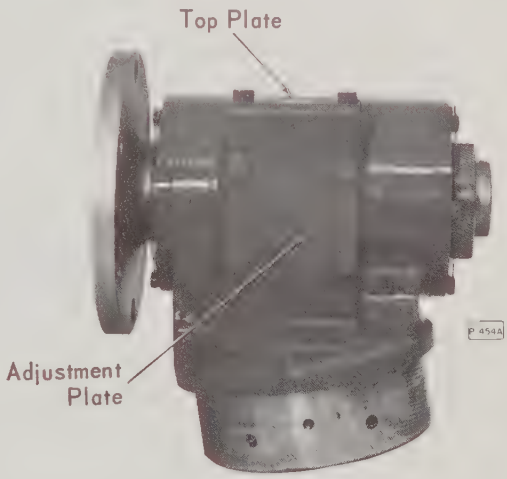


Fig. 4.1. Side View of Metallic Head

(k) When the backlash is satisfactory, replace the adjustment plate and tighten the bolts.

(l) Replace the top plate and tighten the bolts.

If this procedure does not remove the backlash as desired, a more comprehensive adjustment is indicated. Please contact your local Scientific-Atlanta sales representative.

To engage the torque tube and drive spline, the tower may have to be removed from the offset arm. Be careful not to damage the spline when the torque-tube fitting is slid over it.

4.2 Synchro Transmitter Unit Adjustment

The synchro transmitter unit can be adjusted for any arbitrary model-zero orientation. The following procedure is recommended.

(a) Rotate the model to the desired zero orientation.

(b) Remove the bottom cover plate and gasket from the offset arm base casting.

WARNING

LINE VOLTAGE (115V AC) IS PRESENT ON THE TERMINAL STRIP WHEN POWER IS APPLIED. USE CAUTION WHILE ADJUSTING THE SYNCHRO UNIT.

(c) With a 5/64-inch Allen wrench, carefully loosen the set screw that holds the flexible coupling* to the synchro input shaft.

(d) Rotate the input shaft by hand until the remote indicator reads zero.

(e) Hold the shaft stationary and tighten the set screw in the flexible coupling.

(f) Replace the bottom cover plate and gasket.

Adjustment of the tower synchros may not be necessary if the indicator synchro receivers can be rotated, or if indicator units with settable pointers are incorporated in the position-display system. Scientific-Atlanta antenna pattern recorders have chart-drive adjustments which also may render the adjustment of tower synchros unnecessary.

See paragraph 5.2.3 for synchro-replacement information.

*Item (19), Fig. 6.1.

CHAPTER 5
MAINTENANCE

5.1 Lubrication

5.1.1 Gear Box

Every three months grease the gears with Texaco Uni-Temp EP* grease, or equivalent. The gears are accessible through two openings in the side of the gear box.

5.1.2 Head Gears

Periodic checks should be made to ensure the presence of grease on the head-drive gears. Replenish with Texaco Uni-Temp EP* grease, or equivalent, when necessary. A grease plug in the head casting is available for this purpose. Avoid excessive greasing; two or three shots is sufficient.

To lubricate the dielectric head gears, insert one shot of Dow Corning Silicone Grease** through the grease fittings.

5.1.3 Continuously Variable Offset Arm

Lubricate the lead screw and sliding members periodically with Texaco Uni-Temp EP* grease, or equivalent. Inject two or three shots of grease in the grease fitting near the handcrank.

5.1.4 Bearings

All bearings are permanently lubricated and sealed.

5.2 Electrical

5.2.1 Drive Motor

Inspect the drive-motor brushes and commutator regularly for signs of wear. Replace brushes before their length is reduced to less than 1/4 inch. The commutator should be cleaned as necessary. A commutator in good condition is clean, smooth, and light brown and has a medium polish. Use a very fine grain (0000) sandpaper or a piece of canvas; do not use emery cloth.

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*MIL-G-3278
**No. 33, medium consistency

5.2.2 Electrical Connectors

A protective cap should be placed on all connectors not in use to prevent water and dirt from fouling the contacts.

5.2.3 Synchros

Synchro transmitters may be replaced in the field if the following precautions are observed:

(a) Do not force the gear on the synchro shaft during removal or replacement. The gears used are precision made and must be treated with care.

(b) Make sure that the gear train is free-running after synchro replacement.

In dual-synchro units, the two synchro transmitters should be electrically zeroed together for optimum performance. A recommended electrical-zeroing procedure is located after page 5-3.

5.3 Disassembly

If it should become necessary to disassemble the tower, the following procedure is recommended.

(a) Remove the four bolts that hold the mast assembly to the offset arm.

(b) Separate the mast and offset arm; be careful not to damage the drive spline.

(c) Remove the screws that hold the head to the mast and pull the head and torque tube out of the mast. A torque-tube guide plate is located midway up the mast on Model 5863. The torque tube drive fitting (item (13), Fig. 6.1) must be removed to slide the torque tube through the bearing.

(d) Pull out the pin in the universal joint to separate the head assembly and torque tube.

(e) To remove the drive unit from the offset arm, take out the seven bolts that hold the mounting plate to the casting. Tap lightly on the end of the drive spline and withdraw the drive unit carefully. Do not damage the bearing in the base casting.

Reassemble the tower in reverse order. Be careful not to damage the drive spline or torque tube when mounting the mast assembly on the offset arm.

5.4 Painting

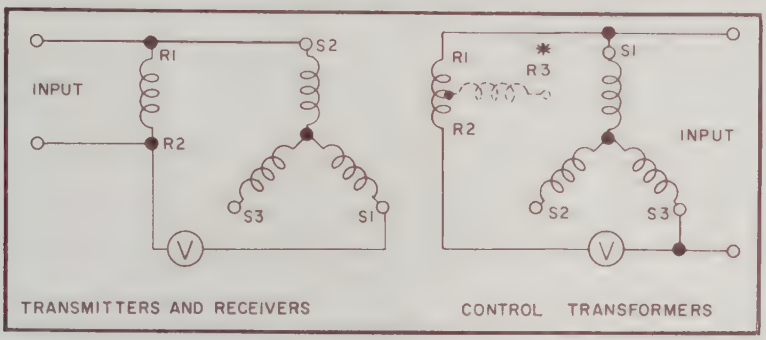
If required, paint the dielectric surface with Sky-Spar Epoxy #511 Gloss White, #CVA 9 597, manufactured by Andrew Brown Company, P. O. Box 1345, Irving, Texas, or equivalent. The metallic parts may be painted as desired; do not paint the slide tubes or lead screw in the offset arm.

SYNCHRO ELECTRICAL ZERO

The electrical zero of a synchro is defined as that position of the rotor, with respect to the stator, where the voltage between S1 and S3 is zero and where the voltage from S2 to S1 is in phase with the voltage from R1 to R2.

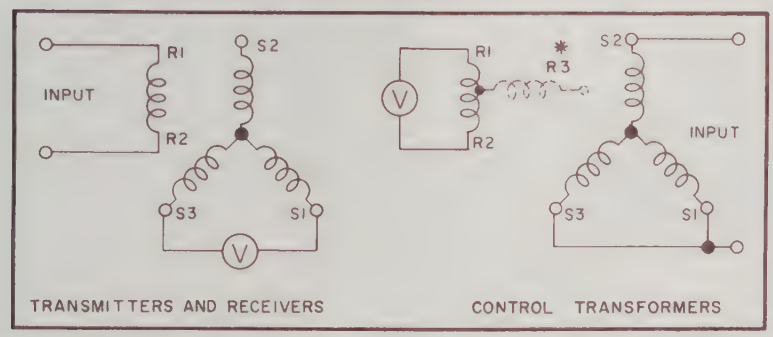
There are two null positions for any synchro. For the correct null, connect the synchro to a voltage source and voltmeter as shown in (A) below; then turn the rotor to determine coarse zero. As the rotor is turned, one null point near the correct electrical zero will be found. To determine the fine electrical zero, connect the synchro as shown in (B) and adjust the rotor slightly until a null is established. This is the exact electrical zero.

(A) COARSE ZERO



*WHEN CDX IS USED AS CT IN S-A TWO-SPEED SYNCHRO PEDESTAL SYSTEMS.

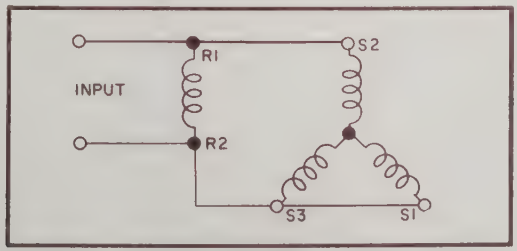
(B) FINE ZERO



*WHEN CDX IS USED AS CT IN S-A TWO-SPEED SYNCHRO PEDESTAL SYSTEMS.

To zero a synchro receiver when its shaft can rotate freely (as in a position indicator), remove all leads from the synchro and reconnect them as shown in (C). The synchro shaft will turn to the electrical zero position when rotor voltage is applied. Do not leave the synchro connected in this manner for more than two minutes, because the synchro will overheat.

(C) RECEIVER ZERO BY ELECTRICAL LOCK



CHAPTER 6
REPLACEMENT PARTS LIST

MANUFACTURERS' CODE LETTERS

Code	Manufacturer
ABT	Armstrong Bros. Tool
ALE	Alemite
AVD	Avdel
BCI	Ballcrank
BK	Balkamp
FB	Fafnir
JT	Jergens Tool
LOV	Lovejoy Flexible Coupling
MS	Micro Switch
SA	Scientific-Atlanta
TAY	Taylor Electric
VM	Victor Mfg. and Gasket
WPD	S.S. White Plastics
--	In "Mfr." column, signifies common item available locally. In "Mfr. Part No." column, signifies not used on this model.

PARTS LIST

ITEM	DESCRIPTION	MFR.*	TOWER MODEL NO. 5851	5852	5861	5861-DH
			PART NUMBER			
1	Spanner wrench	ABT	483	483	483	--
2	Arbor-locking nut	SA	B15890	B15890	B15909	--
3	Head assembly (metallic)	SA	D15891	D15891	D15892	--
4	Grease fitting	ALE	1610-BL	1610-BL	1610-BL	--
5	Model-mounting arbor	SA	C15885	C15885	C15894	--
6	Arbor key	SA	B18359	B18359	B15906	--
7	Release pin	AVD	50603S4R10	50603S4R10	50603S4R10	--
8	Universal joint	SA	A17116	A17116	A17116	--
9	Upper torque-tube fitting	SA	B20727	B19459	(B19459)	--
10	Wiring trough (specify length)	TAY	TD-075 Type R	TD-075 Type R	TD-075 Type R	TD-075 Type R
11	Torque tube	SA	1.5 OD x 1/8 wall**	2 OD x 1/4 wall**	2 OD x 1/4 wall**	--
12	Mast-base assembly	SA	D19461	D19465	D18090	D18090
13	Lower torque-tube fitting	SA	B19460	B20726	B20726	--
14	Bearing seal	VM	63564	63564	63564	63564
15	Bearing	FB	5204KD	5204KD	5204KD	5204KD
16	Base-offset arm assembly	SA	B37717	B22433	B22432	B22432
17	Drive unit assembly	SA	--	D17131	D17131	D17131
18	Gearbox assembly	SA	B37718	B22431	B22431	B22431
19	Flexible coupling	LOV	--	L035	L035	L035
20	Synchro transmitter unit (1:1) Synchro transmitter unit (36:1) Synchro transmitter unit (1:1 & 36:1)	SA SA SA	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B
21	Drive-motor	SA	B2150E-100***	B17118	B17118	B17118
22	Cover-plate gasket	SA	--	C17147	C17147	C17147
23	Cover plate	SA	C34500	C17146	C17146	C17146
24	Allen wrench	--	--	1/2" hex	1/2" hex	1/2" hex
25	Offset arm cover	SA	C34495	D17673	D17111	D17111
26	Bumper (front or rear)	BK	--	3-5347	3-5347	3-5347
27	Grease fitting	ALE	--	1610-BL	1610-BL	1610-BL
28	Sleeve	BCI	--	H63591	H63591	H63591
29	Handwheel	SA	--	B20920	B20920	B20920
30	Jam nut	--	--	3/4-16	3/4-16	3/4-16
31	Washer, flat	--	--	1/2	1/2	1/2
32	Hex nut	--	--	1/2-13	1/2-13	1/2-13
33	Handle	JT	--	HT-50	HT-50	HT-50
34	Interlock switch	MS	--	BZ2RW82255-A2	BZ2RW82255-A2	BZ2RW82255-A2
35	Caution plate	SA	--	B35448	B35448	B35448
36	Lower torque-tube fitting	SA	--	--	--	B19460
37	Torque tube	SA	--	--	--	B19457
38	Nylon round-head screw	SA	--	--	--	10-24 x 1/2
39	Universal joint lower half	SA	--	--	--	C20593
40	Pivot screw	SA	--	--	--	B20594
41	Universal joint pivot shaft	SA	--	--	--	B20592
42	Universal joint pivot pin	SA	--	--	--	A20591
43	Head-shaft set screw	SA	--	--	--	B20597
44	Head shaft	SA	--	--	--	B20590
45	Pipe plug	WPD	--	--	--	1604-132-Y
46	Head assembly (dielectric)	SA	--	--	--	B22430

*See "MANUFACTURERS' CODE LETTERS."
**Specify length required.
***Bodine Electric.

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PARTS LIST

ITEM	5862	5862-DH	5863	5863-DH	5871	5872
	PART NUMBER					
1	483	--	483	--	483	483
2	B15909	--	B15909	--	B15909	B15909
3	D15892	--	D15893	--	D15893	D15893
4	1610-BL	--	1610-BL	--	1610-BL	1610-BL
5	C15894	--	C15894	--	C15894	C15894
6	B15906	--	C15906	--	B15906	B15906
7	50603S4R10	--	50603S4R10	--	50603S4R10	50603S4R10
8	A17116	--	A17116	--	A17116	A17116
9	B19459	--	B20727	--	B19459	B19459
10	TD-075 Type R	TD-075 Type R	TD-075 Type R	TD-075 Type R	TD-075 Type R	TD-075 Type R
11	2 OD x 1/4 wall**	--	B24266	--	2 OD x 1/4 wall**	2 OD x 1/4 wall**
12	D18091	D18091	D19454	D19454	D18090	D18091
13	B20726	--	B20726	--	B20726	B20726
14	63564	63564	63564	63564	63564	63564
15	5204KD	5204KD	5204KD	5204KD	5204KD	5204KD
16	B22433	B22433	B22434	B22434	B22432	B22433
17	D17131	D17131	D17131	D17131	D17131	D17131
18	B22431	B22431	B22431	B22431	B22431	B22431
19	L035	L035	L035	L035	L035	L035
20	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B	4329B 4325B 4324B
21	B17118	B17118	B17118	B17118	B17118	B17118
22	C17147	C17147	C17147	C17147	C17147	C17147
23	C17146	C17146	C17146	C17146	C17146	C17146
24	1/2" hex	1/2" hex	1/2" hex	1/2" hex	1/2" hex	1/2" hex
25	D17673	D17673	D19086	D19086	D17111	D17673
26	3-5347	3-5347	3-5347	3-5347	3-5347	3-5347
27	1610-BL	1610-BL	1610-BL	1610-BL	1610-BL	1610-BL
28	H63591	H63591	H63591	H63591	H63591	H63591
29	B20920	B20920	B20920	B20920	B20920	B20920
30	3/4-16	3/4-16	3/4-16	3/4-16	3/4-16	3/4-16
31	1/2	1/2	1/2	1/2	1/2	1/2
32	1/2-13	1/2-13	1/2-13	1/2-13	1/2-13	1/2-13
33	HT-50	HT-50	HT-50	HT-50	HT-50	HT-50
34	BZ2RW82255-A2	BZ2RW82255-A2	BZ2RW82255-A2	BZ2RW82255-A2	BZ2RW82255-A2	BZ2RW82255-A2
35	B35448	B35448	B35448	B35448	B35448	B35448
36	--	B19460	--	B19460	--	--
37	--	B19466	--	B19460	--	--
38	--	10-24 x 1/2	--	10-24 x 1/2	--	--
39	--	C20593	--	C20593	--	--
40	--	B20594	--	B20594	--	--
41	--	B20592	--	B20592	--	--
42	--	A20591	--	A20591	--	--
43	--	B20597	--	B20597	--	--
44	--	B20590	--	B20590	--	--
45	--	1604-132-Y	--	1604-132-Y	--	--
46	--	B22430	--	B22430	--	--

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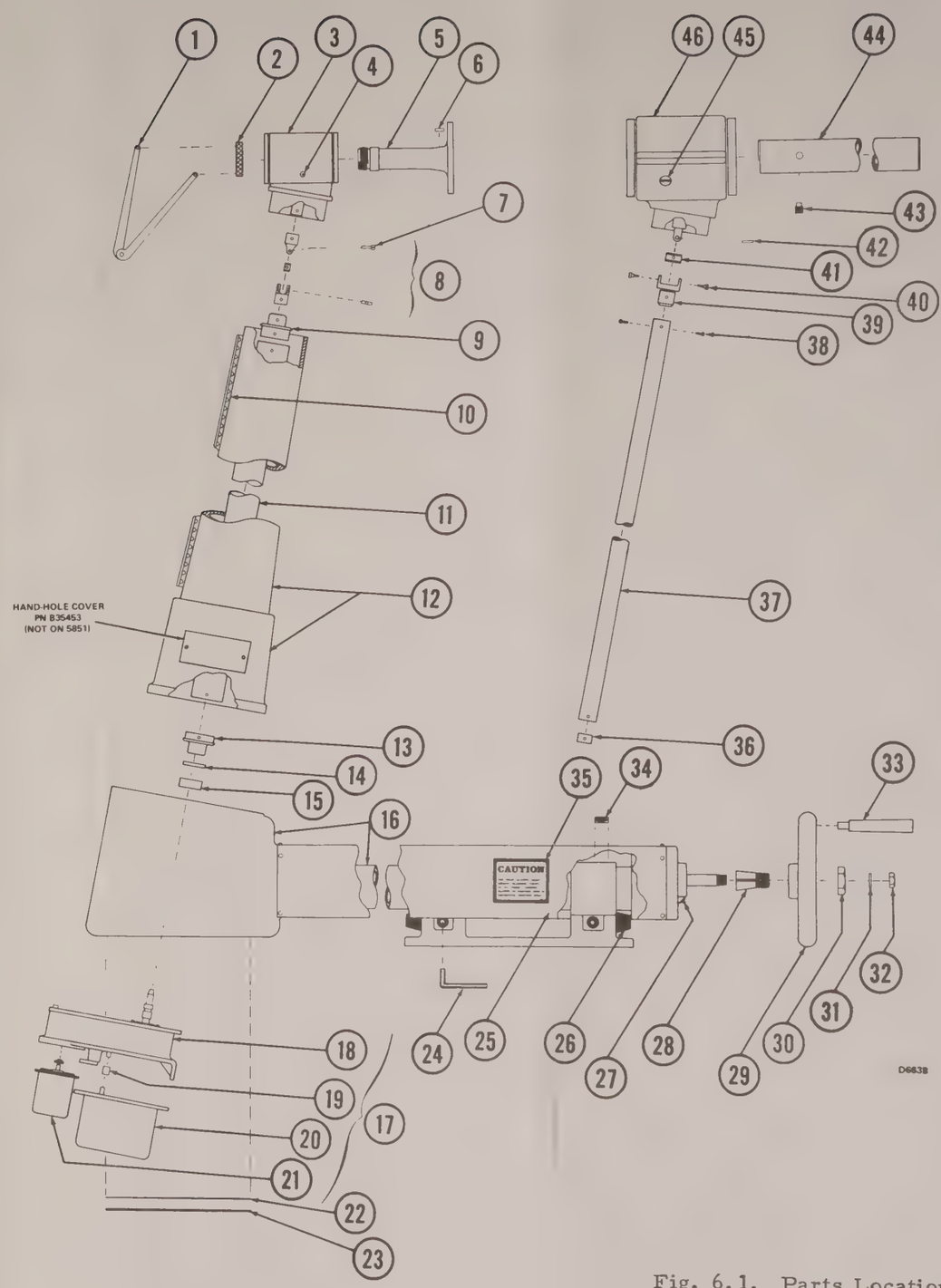
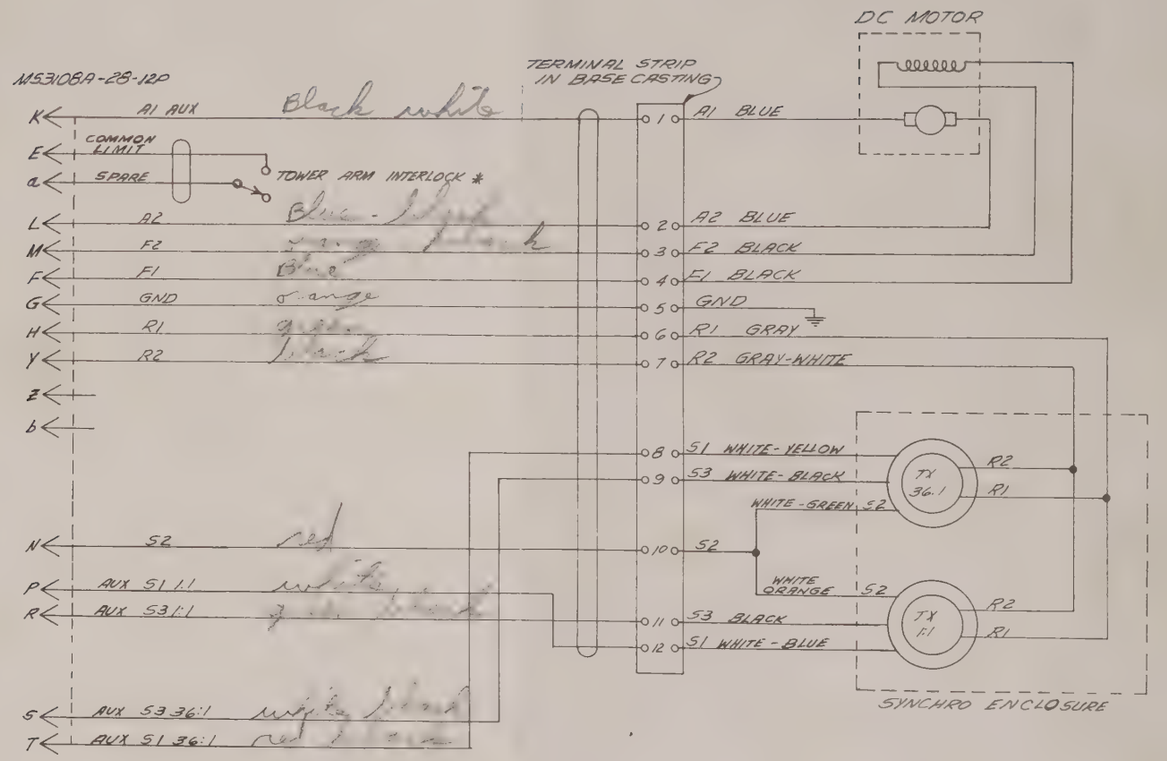


Fig. 6.1. Parts Location Drawing, Series 5800 Model Tower



WHERE THE GEARING OF THE SYNCHRO PROVIDES IMPROPER OUTPUT PHASE SEQUENCE, THE S1 & S3 LEADS HAVE BEEN EXCHANGED AT THE TERMINAL BOARD.

* NOT INCLUDED ON MODEL 5851

Fig. 6.2. Series 5850, 5860, and 5870 Model Towers, Schematic Diagram

CONVERSION OF VOLTAGE AND POWER RATIOS TO DECIBELS

The basic chart below indicates the number of decibels (dB) corresponding to the listed ratios of voltage or power over the range of −20 to +20 dB. For voltage or power ratios greater than those included in the chart, the ratio can be broken down into a product of two numbers, the value in dB for each found separately, and the two results added. Example: To convert a power ratio of 2,000:1 to dB, express 2,000 as 2×10^3; the number of dB corresponding to a power ratio of 2 is very nearly 3, and the number of dB for a power ratio of 10^3 is 30. Therefore, the power ratio of 2,000:1 is approximately 30 dB + 3 dB = 33 dB. In the lower righthand corner of the chart dB values for voltage and power ratios of integral powers of 10 are given.

Voltage Ratio	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*
1.000	**1.000**	**0**	**1.000**	**1.000**	**.447**	**.200**	**7.0**	**2.239**	**5.012**	**.200**	**.0398**	**14.0**	**5.012**	**25.12**
.989	.977	.1	1.012	1.023	.442	.195	7.1	2.265	5.129	.197	.0389	14.1	5.070	25.70
.977	.955	.2	1.023	1.047	.437	.191	7.2	2.291	5.248	.195	.0380	14.2	5.129	26.30
.966	.933	.3	1.035	1.072	.432	.186	7.3	2.317	5.370	.193	.0372	14.3	5.188	26.92
.955	.912	.4	1.047	1.096	.427	.182	7.4	2.344	5.495	.191	.0363	14.4	5.248	27.54
.944	.891	.5	1.059	1.122	.422	.178	7.5	2.371	5.623	.188	.0355	14.5	5.309	28.18
.933	.871	.6	1.072	1.148	.417	.174	7.6	2.399	5.754	.186	.0347	14.6	5.370	28.84
.923	.851	.7	1.084	1.175	.412	.170	7.7	2.427	5.888	.184	.0339	14.7	5.433	29.51
.912	.832	.8	1.096	1.202	.407	.166	7.8	2.455	6.026	.182	.0331	14.8	5.495	30.20
.902	.813	.9	1.109	1.230	.403	.162	7.9	2.483	6.166	.180	.0324	14.9	5.559	30.90
.891	**.794**	**1.0**	**1.122**	**1.259**	**.398**	**.159**	**8.0**	**2.512**	**6.310**	**.178**	**.0316**	**15.0**	**5.623**	**31.62**
.881	.776	1.1	1.135	1.288	.394	.155	8.1	2.541	6.457	.176	.0309	15.1	5.689	32.36
.871	.759	1.2	1.148	1.318	.389	.151	8.2	2.570	6.607	.174	.0302	15.2	5.754	33.11
.861	.741	1.3	1.161	1.349	.385	.148	8.3	2.600	6.761	.172	.0295	15.3	5.821	33.88
.851	.724	1.4	1.175	1.380	.380	.145	8.4	2.630	6.918	.170	.0288	15.4	5.888	34.67
.841	.708	1.5	1.189	1.413	.376	.141	8.5	2.661	7.079	.168	.0282	15.5	5.957	35.48
.832	.692	1.6	1.202	1.445	.372	.138	8.6	2.692	7.244	.166	.0275	15.6	6.026	36.31
.822	.676	1.7	1.216	1.479	.367	.135	8.7	2.723	7.413	.164	.0269	15.7	6.095	37.15
.813	.661	1.8	1.230	1.514	.363	.132	8.8	2.754	7.586	.162	.0263	15.8	6.166	38.02
.804	.646	1.9	1.245	1.549	.359	.129	8.9	2.786	7.762	.160	.0257	15.9	6.237	38.90
.794	**.631**	**2.0**	**1.259**	**1.585**	**.355**	**.126**	**9.0**	**2.818**	**7.943**	**.159**	**.0251**	**16.0**	**6.310**	**39.81**
.785	.617	2.1	1.274	1.622	.351	.123	9.1	2.851	8.128	.157	.0246	16.1	6.383	40.74
.776	.603	2.2	1.288	1.660	.347	.120	9.2	2.884	8.318	.155	.0240	16.2	6.457	41.69
.767	.589	2.3	1.303	1.698	.343	.118	9.3	2.917	8.511	.153	.0234	16.3	6.531	42.66
.759	.575	2.4	1.318	1.738	.339	.115	9.4	2.951	8.710	.151	.0229	16.4	6.607	43.65
.750	.562	2.5	1.334	1.778	.335	.112	9.5	2.985	8.913	.150	.0224	16.5	6.683	44.67
.741	.550	2.6	1.349	1.820	.331	.110	9.6	3.020	9.120	.148	.0219	16.6	6.761	45.71
.733	.537	2.7	1.365	1.862	.327	.107	9.7	3.055	9.333	.146	.0214	16.7	6.839	46.77
.724	.525	2.8	1.380	1.905	.324	.105	9.8	3.090	9.550	.145	.0209	16.8	6.918	47.86
.716	.513	2.9	1.396	1.950	.320	.102	9.9	3.126	9.772	.143	.0204	16.9	6.998	48.98
.708	**.501**	**3.0**	**1.413**	**1.995**	**.316**	**.100**	**10.0**	**3.162**	**10.000**	**.141**	**.0200**	**17.0**	**7.079**	**50.12**
.700	.490	3.1	1.429	2.042	.313	.0977	10.1	3.199	10.23	.140	.0195	17.1	7.161	51.29
.692	.479	3.2	1.445	2.089	.309	.0955	10.2	3.236	10.47	.138	.0191	17.2	7.244	52.48
.684	.468	3.3	1.462	2.138	.306	.0933	10.3	3.273	10.72	.137	.0186	17.3	7.328	53.70
.676	.457	3.4	1.479	2.188	.302	.0912	10.4	3.311	10.96	.135	.0182	17.4	7.413	54.95
.668	.447	3.5	1.496	2.239	.299	.0891	10.5	3.350	11.22	.133	.0178	17.5	7.499	56.23
.661	.437	3.6	1.514	2.291	.295	.0871	10.6	3.388	11.48	.132	.0174	17.6	7.586	57.54
.653	.427	3.7	1.531	2.344	.292	.0851	10.7	3.428	11.75	.130	.0170	17.7	7.674	58.88
.646	.417	3.8	1.549	2.399	.288	.0832	10.8	3.467	12.02	.129	.0166	17.8	7.762	60.26
.638	.407	3.9	1.567	2.455	.285	.0813	10.9	3.508	12.30	.127	.0162	17.9	7.852	61.66
.631	**.398**	**4.0**	**1.585**	**2.512**	**.282**	**.0794**	**11.0**	**3.548**	**12.59**	**.126**	**.0159**	**18.0**	**7.943**	**63.10**
.624	.389	4.1	1.603	2.570	.279	.0776	11.1	3.589	12.88	.125	.0155	18.1	8.035	64.57
.617	.380	4.2	1.622	2.630	.275	.0759	11.2	3.631	13.18	.123	.0151	18.2	8.128	66.07
.610	.372	4.3	1.641	2.692	.272	.0741	11.3	3.673	13.49	.122	.0148	18.3	8.222	67.61
.603	.363	4.4	1.660	2.754	.269	.0724	11.4	3.715	13.80	.120	.0145	18.4	8.318	69.18
.596	.355	4.5	1.679	2.818	.266	.0708	11.5	3.758	14.13	.119	.0141	18.5	8.414	70.79
.589	.347	4.6	1.698	2.884	.263	.0692	11.6	3.802	14.45	.118	.0138	18.6	8.511	72.44
.582	.339	4.7	1.718	2.951	.260	.0676	11.7	3.846	14.79	.116	.0135	18.7	8.610	74.13
.575	.331	4.8	1.738	3.020	.257	.0661	11.8	3.890	15.14	.115	.0132	18.8	8.710	75.86
.569	.324	4.9	1.758	3.090	.254	.0646	11.9	3.936	15.49	.114	.0129	18.9	8.811	77.62
.562	**.316**	**5.0**	**1.778**	**3.162**	**.251**	**.0631**	**12.0**	**3.981**	**15.85**	**.112**	**.0126**	**19.0**	**8.913**	**79.43**
.556	.309	5.1	1.799	3.236	.248	.0617	12.1	4.027	16.22	.111	.0123	19.1	9.016	81.28
.550	.302	5.2	1.820	3.311	.246	.0603	12.2	4.074	16.60	.110	.0120	19.2	9.120	83.18
.543	.295	5.3	1.841	3.388	.243	.0589	12.3	4.121	16.98	.108	.0118	19.3	9.226	85.11
.537	.288	5.4	1.862	3.467	.240	.0575	12.4	4.169	17.38	.107	.0115	19.4	9.333	87.10
.531	.282	5.5	1.884	3.548	.237	.0562	12.5	4.217	17.78	.106	.0112	19.5	9.441	89.13
.525	.275	5.6	1.905	3.631	.234	.0550	12.6	4.266	18.20	.105	.0110	19.6	9.550	91.20
.519	.269	5.7	1.928	3.715	.232	.0537	12.7	4.315	18.62	.104	.0107	19.7	9.661	93.33
.513	.263	5.8	1.950	3.802	.229	.0525	12.8	4.365	19.05	.102	.0105	19.8	9.772	95.50
.507	.257	5.9	1.972	3.890	.227	.0513	12.9	4.416	19.50	.101	.0102	19.9	9.886	97.72
.501	**.251**	**6.0**	**1.995**	**3.981**	**.224**	**.0501**	**13.0**	**4.467**	**19.95**	**.100**	**.0100**	**20.0**	**10.000**	**100.00**
.496	.246	6.1	2.018	4.074	.221	.0490	13.1	4.519	20.42					
.490	.240	6.2	2.042	4.169	.219	.0479	13.2	4.571	20.89		10^{-3}	30		10^3
.484	.234	6.3	2.065	4.266	.216	.0468	13.3	4.624	21.38	10^{-2}	10^{-4}	40	10^2	10^4
.479	.229	6.4	2.089	4.365	.214	.0457	13.4	4.677	21.88					
											10^{-5}	50		10^5
.473	.224	6.5	2.113	4.467	.211	.0447	13.5	4.732	22.39	10^{-3}	10^{-6}	60	10^3	10^6
.468	.219	6.6	2.138	4.571	.209	.0437	13.6	4.786	22.91		10^{-7}	70		10^7
.462	.214	6.7	2.163	4.677	.207	.0427	13.7	4.842	23.44	10^{-4}	10^{-8}	80	10^4	10^8
.457	.209	6.8	2.188	4.786	.204	.0417	13.8	4.898	23.99		10^{-9}	90		10^9
.452	.204	6.9	2.213	4.898	.202	.0407	13.9	4.955	24.55					
										10^{-5}	10^{-10}	100	10^5	10^{10}
											10^{-11}	110		10^{11}
										10^{-6}	10^{-12}	120	10^6	10^{12}

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